

DETAILED ACTION

- Claims 1, 3-5, 9, 11, 15, 21, 26-41 as amended are currently pending with the application. Claims 1, 9, 11, 15, 21, were amended. Claims 2, 6-8, 10, 12-14, 16-20 and 22-25 cancelled. Claims 26-41 added. The indicated allowability of claims 8, 10 and 21 are withdrawn over the new rejections cited in the office action.

Claim Rejections - 35 USC § 102

Claim Rejections - 35 USC § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1, 4, 5, 9, 11 and 15 are rejected under 35 U.S.C. 103(a) as obvious over Malozemoff et al (6,436,317).

The examiner makes of record that instant claim 1, recites a broad range of components followed by a series of narrow ranges. For examination purposes, the examiner asserts that the narrow ranges recited in instant claim 1 are merely exemplary ranges, and thus, the prior art will be applied against the broadest ranges recited in instant claim 1. Furthermore, the examiner suggests that applicant should delete the narrow ranges from instant claim 1, and add new dependent claims that recite the narrow ranges recited in instant claim 1. The limitation of "preferably" makes the component optional, and the Language that suggests or makes optional but does not require steps/components to be performed/ included or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation.

Malozemoff et al teach a superconductor article comprising two substrates (See, Fig 6A and 6B; 62a and 62b), a buffer layer (64a and 64b) over each of the substrates, a superconductor layer overlying the buffer layer (66a and 66b) and a cap layer (68a, 68b) overlying the superconductor layer, and the two superconductor layers joined together forming the elongated article (Fig-6B). The prior art further teaches that the superconductor can be doped to improve its superconducting properties (CI-5, Ln 26-29). The structure in the Fig-6a has at least 50% overlap between the superconductor layers that meets extent of contact between the superconductor layers in the instant claim. The prior art teaches bundling of wires by cabling, twisting or braiding (CI-17, Ln 61-63) and sintering forming the tape (CI-13, Ln 17-33; CI-18, Ln

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31-33). The prior art further teaches fine grain structured polycrystalline bronze oxides that are rod-like or equiaxed or contoured over grains of the roll textured substrate (CI-3, Ln 1-30).

The prior art is silent about the aspect ratio of the superconductor grains per the claim-1.

The instant claimed aspect ratio/factor of at least 1.5 would be obvious in the rod-shaped or equiaxed grains of the superconductor in superconductor layer, and further it would be obvious in epitaxial HTS films over roll textured surfaces due to the development of grains in the metallic tape during texturing.

2. Claims 1, 3-5 9 and 21 are rejected under 35 U.S.C. 103(a) as obvious over Belenli et al (US 6,387,525) in view of Fritzeimer (US 6,562,761) and Malozemoff et al (6,436,317).

Belenli et al teaches a superconductor article with architecture comprising two superconductor tapes joined together forming a laminate/coil (Fig-2-5). Each of the two superconductor tapes (Fig 2 and 4) comprised of superconductor layers (19 and 21) on opposite surfaces of the substrate comprising a lamination of layers 13 and 15 bonded through an layer 17 forming two substrates having superconductor layers on opposing sides and joined at the interface of superconductor layers 19 and 21 in face-face configuration. The superconductor forming the layers included YBCO. The superconductor article was made contacting superconducting layers 19 and 21, whose contact with each other was throughout the pancake coil of the article (Fig-3) and this meets the limitation of the structure and the ratio limitations the claims (CI-4, Ln-65 to CI-5, Ln 7; CI-5, Ln 27-30, 45-49; CI-6, Ln 19-32). The prior art teaches winding the coil and annealing (CI-6, Ln 15-19) and hot rolling it (CI-3, Ln 37-43).

The prior art fails to teach an average grain size of the in the superconducting layer per claim-1 and a heterostructure containing doped HTS film per claim-9.

In the analogous art, Fritzeimer teaches coated conductors containing YBCO or BSCCO over buffer layer-support system and the benefits of their doped superconductors with form with high Jc values over textured metallic substrates for tapes/cables (CI-2, Ln 35-47).

In the analogous art, Malozemoff et al teach the presence of rod-like or equiaxed or surface contoured grains of bronze superconductors that are perovskite type structures and have close lattice match parameters with YBCO over textured metallic substrates (CI-3, Ln 1-30; CI-11, Ln 59-67).

It would have been obvious to a person of ordinary skilled in the art at the time of the disclosure of the invention by the applicants to fabricate the superconductor coil of Belenli with a doped superconductor layer of YBCO and/or Fritzemeier's superconductor structure to benefit from improved J_c with reasonable expectation of success because the prior art is concerned with high magnetic density that is also associated with J_c of the wire, and the presence of grains in the superconductor would be obvious over the disclosure of Malozemoff et al because these are related to perovskite type structures and due to the development of grains in the metallic tape during roll texturing.

3. Claims 26, 28-29, 31 and 32 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Malozemoff et al (6,436,317).

The examiner makes of record that instant claim 26, recite a broad range of components followed by a series of narrow ranges. For examination purposes, the examiner asserts that the narrow ranges recited in instant claim 26 are merely exemplary ranges, and thus, the prior art will be applied against the broadest ranges recited in instant claim 26. Furthermore, the examiner suggests that applicant should delete the narrow ranges from instant claims 26, and add new dependent claims that recite the narrow ranges recited in instant claim 26. The limitation of "preferably" makes the component optional, and the Language that suggests or makes optional but does not require steps/components to be performed/ included or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation.

Malozemoff et al teach a superconductor article comprising two substrates (See, Fig 6A and 6B; 62a and 62b), a buffer layer (64a and 64b) over each of the substrates, a superconductor layer overlying the buffer layer (66a and 66b) and a cap layer (68a, 68b) overlying the superconductor layer, and the two superconductor layers joined together forming the elongated article (Fig-6B). The prior art further teaches that the superconductor can be doped to improve its superconducting properties (CI-5, Ln 26-29). The structure in the Fig-6a has at least 50% overlap between the superconductor layers that meets extent of contact between the superconductor layers in the instant claim. The prior art teaches bundling of wires by cabling, twisting or braiding (CI-17, Ln 61-63) and sintering forming the tape (CI-13, Ln 17-33; CI-18, Ln

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31-33). The prior art further teaches fine grain structured polycrystalline bronze oxides that are rod-like or equiaxed or contoured over grains of the roll textured substrate (Cl-3, Ln 1-30). All the limitations of the instant claims are met.

The reference is anticipatory.

In the alternative that the disclosure by Malozemoff et al be insufficient to arrive at the limitations of the instant claims, it would have been obvious to a person of ordinary skilled in the art to fabricate long-length flexible wires with the structure of Malozemoff, because the prior art is suggestive of it (Cl-4, Ln 23-28).

4. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malozemoff et al (6,436,317).

The disclosure on the structure of superconducting article by Malozemoff et al as set forth in rejection-3 under 35 USC 102(e)/103(a) is herein incorporated. The prior art further teaches fine grain structured polycrystalline bronze oxides that are rod-like or equiaxed (Cl-3, Ln 1-6).

The prior art is silent about the aspect ratio of the grains.

The instant claimed aspect ratio/factor of at least 1.5 would be obvious in the rod-shaped or equiaxed grains of the superconductor in superconductor layer and further it would be obvious in epitaxial HTS films over roll textured surfaces due to the development of grains in the metallic tape during roll texturing.

5. Claims 26-27, 29, 31, and 33 are rejected under 35 U.S.C. 103(a) as obvious over Belenli et al (US 6,387,525) in view of Fritzemeier (US 6,562,761).

Belenli et al teaches a superconductor article with architecture comprising two superconductor tapes joined together forming a laminate/coil (Fig-2-5). Each of the two superconductor tapes (Fig 2 and 4) comprised of superconductor layers (19 and 21) on opposite surfaces of the substrate comprising a lamination of layers 13 and 15 bonded through an layer 17 forming two substrates having superconductor layers on opposing sides and joined at the interface of superconductor layers 19 and 21 in face-face configuration. The superconductor forming the layers included YBCO. The superconductor article was

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made contacting superconducting layers 19 and 21, whose contact with each other was throughout the pancake coil of the article (Fig-3) and this meets the limitation of the structure and the ratio limitations the claims (Cl-4, Ln-65 to Cl-5, Ln 7; Cl-5, Ln 27-30, 45-49; Cl-6, Ln 19-32). The prior art teaches winding the coil and annealing it (Cl-6, Ln 15-19) and hot rolling (Cl-3, Ln 37-43).

The prior art fails to teach a heterostructure containing doped HTS film per claim-26.

In the analogous art, Fritzsche teaches coated conductors containing YBCO or BSCCO over buffer layer-support system and the benefits of their doped superconductors with form with high Jc values over textured metallic substrates for tapes/cables (Cl-2, Ln 35-47).

It would have been obvious to a person of ordinary skill in the art at the time of the disclosure of the invention to fabricate the superconductor coil of Belenli with a doped superconductor layer of YBCO to benefit from improved Jc because that was well known in the art as disclosed by Fritzsche with reasonable expectation of success because the prior art is concerned with high magnetic density that is also associated with Jc of the wire.

6. Claims 34-37, 39 and 41 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Belenli et al (US 6,387,525).

The examiner makes of record that instant claims 34, recite a broad range of components followed by a series of narrow ranges. For examination purposes, the examiner asserts that the narrow ranges recited in instant claim 34 are merely exemplary ranges, and thus, the prior art will be applied against the broadest ranges recited in instant claims 34. Furthermore, the examiner suggests that applicant should delete the narrow ranges from instant claim 34, and add new dependent claims that recite the narrow ranges recited in instant claims 34. The limitation of "preferably" makes the component optional, and the Language that suggests or makes optional but does not require steps/components to be performed/ included or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation.

Belenli et al teaches a superconductor article with architecture comprising two superconductor tapes joined together forming a laminate/coil (Fig-2-5). Each of the two superconductor tapes (Fig 2 and 4)

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comprised of superconductor layers (19 and 21) on opposite surfaces of the substrate comprising a lamination of layers 13 and 15 bonded through an layer 17 forming two substrates having superconductor layers on opposing sides and joined at the interface of superconductor layers 19 and 21 in face-face configuration. The superconductor forming the layers included YBCO. The superconductor article was made contacting superconducting layers 19 and 21, whose contact with each other was throughout the pancake coil of the article (Fig-3) and this meets the limitation of the structure and the ratio limitations the claims (Cl-4, Ln 65 to Cl-5, Ln 7; Cl-5, Ln 27-30, 45-49; Cl-6, Ln 19-32). The prior art teaches winding the coil and annealing it (Cl-6, Ln 15-19) and hot rolling (Cl-3, Ln 37-43). All the limitations of the instant claims are met.

The reference is anticipatory.

In the alternative that the disclosure by Belenli et al be insufficient to arrive at the limitations of the instant claims, it would be obvious to a person of ordinary skilled in the art to optimize the pancake design of the coil of the prior art to improve the winding density to benefit from maximum magnetic field that would obviously control the overlapping of the superconductor layers.

7. Claims 38 and 40 rejected under 35 U.S.C. 103(a) as being unpatentable over Belenli et al (US 6,387,525) in view of Fritzemeier (US 6,562,761).

The disclosure on the a superconductor article by Belenli et al (US 6,387,525) as set forth in rejection-1 is herein incorporated.

The prior art fails to teach an hetero-structure per claim 38 and an interlayer over a superconductor layer per claim-40.

In the analogous art, Fritzemeier teaches coated conductors containing YBCO or BSCCO over buffer layer-support system and the benefits of their doped superconductors with form with high Jc values over textured metallic substrates for tapes/cables (Cl-2, Ln 35-47).

It would have been obvious to a person of ordinary skilled in the art at the time of the disclosure of the invention to fabricate the superconductor coil of Belenli with a doped superconductor layer of YBCO to benefit from improved Jc because the that was well known in the art as disclosed by Fritzemeier with

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reasonable expectation of success because the prior art is concerned with high magnetic density that is also associated with Jc of the wire.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KALLAMBELLA VIJAYAKUMAR whose telephone number is (571)272-1324. The examiner can normally be reached on M-F 07-3.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 5712721358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jerry A Lorengo/
Supervisory Patent Examiner, Art Unit 1793

/KMV/
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